

IN THE CLAIMS:

Cancel Claims 1-5 without prejudice.

- Sub 17
1. (Cancelled)
 2. (Cancelled)
 3. (Cancelled)
 4. (Cancelled)
 5. (Cancelled)

6. (Currently Amended) A cross-correlated signal processor comprising:

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(a) means for cross-correlating a first input signal with a second input signal to generate cross-correlated a fraction, or one or more than one symbol synchronous and/or asynchronous time constrained signal (TCS) response and cascaded long response (LR) filtered signal symbols of one or more input signals with signal symbols of a quadrature-phase shifted signal of the in-phase signal, and providing in-phase (I) and quadrature-phase (Q) shifted output signals adapted for Bit Rate Agile (BRA), cascaded mis-matched (ACM) Modulation-Demodulation (Modem) Format Selectable (MFS) and Code Selectable (CS) processing, the first input signal comprising a fraction or one or more than one symbol synchronous and/or asynchronous time constrained signal (TCS) response and cascaded long response (LR) filtered signal symbols of one or more input signals, and the second input signal comprising signal symbols of a quadrature-phase signal, the cross-correlated in-phase (I) and quadrature-phase (Q) output signals generated according to the following schedule:

- cross-correlated
- (i) when the in-phase channel signal is zero, the quadrature-phase shifted signal is close to the maximum amplitude normalized to one (1);
 - (ii) when the in-phase channel signal is non-zero, the maximum magnitude of the quadrature-phase shifted signal is reduced from 1 (normalized) to A, where $0 \leq A \leq 1$;
 - (iii) when the quadrature-phase channel signal is zero, magnitude of the in-phase signal is close to the maximum amplitude; and
 - (iv) when the quadrature-phase channel signal is non-zero, the in-phase signal is reduced from 1 (normalized) to A, where $0 \leq A \leq 1$;

(b) means for quadrature modulating the cross-correlated in-phase and quadrature-phase output signals to provide a cross-correlated quadrature modulated output signal, the means for quadrature modulating including a BRA, MFS and BRA filter set;

(c) controller and selector controlling means and signal selection means for BRA rate, MFS and CS processor selection and processor selection and means for selection for Linear and/or Non-Linearly Amplified (NLA) baseband and/or of Quadrature modulated signals selection;

(d) coupling port means for coupling the cross-correlated quadrature modulated output signal to the a transmission medium;

(e) a BRA, MFS and CS quadrature demodulator;

(ef) a receiver port for connection of the received cross-correlated signal to the BRA, MFS and CS demodulator; and

(f) a BRA, MFS and CS quadrature demodulator; and

(g) a Mis-Matched (MM) demodulator filter set for BRA, MFS and CS in which the said a filter set of the quadrature demodulator filter set is MM mis-matched to the that of the BRA, MFS and BRA filter set of the means for quadrature modulating modulator.

Cancel claim 7 and Claims 10-42 without prejudice or disclaimer, claims 8-9 were previously cancelled.

- 7. (Cancelled)
- 8. (Cancelled)
- 9. (Cancelled)
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17. (Cancelled)
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43. (Currently Amended) A cross-correlated signal processor comprising:

(a) a cross-correlator for cross-correlating a first input signal with a second input signal to generate cross-correlated ~~a fraction, or one or more than one symbol synchronous and/or asynchronous time constrained signal (TCS) response and cascaded long response (LR) filtered signal symbols of one or more input signals with signal symbols of a quadrature-phase shifted signal of the in-phase signal, and providing in-phase (I) and quadrature-phase (Q) shifted output signals adapted for Bit Rate Agile (BRA), cascaded mis-matched (ACM) Modulation-Demodulation (Modem) Format Selectable (MFS) and Code Selectable (CS) processing, the first input signal comprising a fraction or one or more than one symbol synchronous and/or asynchronous time constrained signal (TCS) response and cascaded long response (LR) filtered signal symbols of one or more input signals, and the second input signal comprising signal symbols of a quadrature-phase signal, the cross-correlated in-phase (I) and quadrature-phase (Q) output signals generated~~ according to the following schedule:

(i) when the in-phase ~~channel~~ signal is zero, the quadrature-phase shifted signal is close to the maximum amplitude normalized to one (1);

(ii) when the in-phase ~~channel~~ signal is non-zero, the maximum magnitude of the quadrature-phase shifted signal is reduced from 1 (normalized) to A, where $0 \leq A \leq 1$;

(iii) when the quadrature-phase ~~channel~~ signal is zero, the in-phase signal is close to the maximum amplitude; and

(iv) when the quadrature-phase ~~channel~~ signal is non-zero, the in-phase signal is reduced from 1 (normalized) to A, where $0 \leq A \leq 1$;

(b) a signal modulator for quadrature modulating the cross-correlated in-phase (I) and quadrature-phase (Q) output signals to provide a cross-correlated quadrature modulated output signal, the signal modulator including a BRA, MFS and BRA filter set;

(c) a controller and selector for ~~selecting at least one of:~~ (1) at least one of or any combination of: BRA rate, MFS, and CS processors; ~~selection, and selection for~~ (2) at least one of Linearly and/or Non-Linearly Amplified (NLA) baseband signals, and/or of (3) at least one of

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linearly, non-linearly, or partially linearly and partially non-linearly amplified quadrature modulated signals;

(d) a first ~~signal-coupling~~ for coupling ~~a~~ the cross-correlated quadrature modulated output signal to a transmission medium;

(e) a second ~~signal-coupling~~ for coupling a received cross-correlated quadrature modulated signal from the transmission medium to a receiver having a receiver port;

~~(f) a BRA, MFS, and CS quadrature demodulator;~~

~~(fg) a~~ the receiver port for connection of the received cross-correlated quadrature modulated signal to the BRA, MFS, and CS demodulator; and

~~(g) a BRA, MFS and CS quadrature demodulator; and~~

(h) a Mis-Matched (MM) demodulator filter set for BRA, MFS and CS in which the ~~said~~ demodulator filter set is ~~MM~~ mis-matched to that of the BRA, MFS and BRA filter set of the signal modulator.

Cancel Claims 44-56 without prejudice or disclaimer.

- 44. (Cancelled)
- 45. (Cancelled)
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- 52. (Cancelled)
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57. (Currently Amended) The cross-correlated signal processor of Claim 43, wherein the cross-correlated signal processor is adapted to process (i) an first-in-phase channel-signal set component; and (ii) a second-quadrature-phase channel-signal set-component that is generated as a phase-shifted version of the first in-phase channel signal; and

the in-phase and quadrature-phase channel-signals components characterized in that: (i) when the in-phase channel-signal is zero, the quadrature-phase shifted-signal is close to the maximum amplitude normalized to one (1); (ii) when the in-phase channel-signal is non-zero, the maximum magnitude of the quadrature-phase shifted-signal is reduced from 1 (normalized) to A, where $0 \leq A \leq 1$; (iii) when the quadrature-phase channel-signal is zero, the in-phase signal is close to the maximum amplitude; and (iv) when the quadrature-phase channel-signal is non-zero, the in-phase signal is reduced from 1 (normalized) to A, where $0 \leq A \leq 1$; and

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~~the first in-phase and second quadrature-phase signal set components derived from at least one signal stream as a fraction a symbol or from one or more than one symbol as a time constrained signal (TCS) response and cascaded long response (LR) filtered signal symbols of one or more input signals with signal symbols of a quadrature-phase shifted signal of the in-phase signal.~~

58. (Currently Amended) A bit-rate agile (BRA) and modem format and code selectable (MFS and CS) signal pair comprising:

an first-in-phase channel signal set component; and
a second-quadrature-phase channel signal set-component that is generated as a phase-shifted version of the first in-phase channel signal;

the in-phase and quadrature-phase channel signals characterized in that: (i) when the in-phase channel signal is zero, the quadrature-phase shifted-channel signal is close to the maximum amplitude normalized to one (1); (ii) when the in-phase channel signal is non-zero, the maximum magnitude of the quadrature-phase shifted-channel signal is reduced from 1 (normalized) to A, where $0 \leq A \leq 1$; (iii) when the quadrature-phase channel signal is zero, the in-phase channel signal is close to

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the maximum amplitude; and (iv) when the quadrature-phase channel signal is non-zero, the in-phase signal is reduced from 1 (normalized) to A, where $0 \leq A \leq 1$; and

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the first-in-phase and second-quadrature-phase channel signal set components are derived from at least one input signal stream as a fraction of a symbol or from one or more than one symbol as a time constrained signal (TCS) response and cascaded long response (LR) filtered signal symbols, ~~of one or more input signals with signal symbols of a quadrature-phase shifted signal of the in-phase signal.~~
